

$$0.005\% \leq C \leq 0.02\%$$

$$S \leq 0.001\%$$

$$0.0001\% \leq Ca \leq 0.002\%$$

$$0.0001\% \leq Mg \leq 0.002\%$$

the chemical composition of the alloy furthermore satisfying the relationships:

$$Co + Ni \leq 38.5\%$$

$$Co + 0.5 \times Ni \geq 20\%$$

$$Co + 5 \times Ni \geq 165.5\%$$

wherein % is % by weight, and

$$S \leq 0.02 \times Mn + 0.08 \times Ca + 0.6 \times Mg$$

wherein said alloy has a martensitic transformation start point of less than  $-186^{\circ}\text{C}$  and an average coefficient of thermal expansion between  $20^{\circ}$  and  $100^{\circ}\text{C}$  of from  $0.7 \times 10^{-6}/\text{K}$  to  $0.49 \times 10^{-6}/\text{K}$ .

10. (New) The alloy as claimed in Claim 9, wherein the average coefficient of thermal expansion is from  $0.65 \times 10^{-6}/\text{K}$  to  $0.49 \times 10^{-6}/\text{K}$ .

11. (New) The alloy as claimed in Claim 9, wherein copper, molybdenum, vanadium and niobium are each present in amounts less than 0.1%.

12. (New) The alloy as claimed in Claim 11, wherein the sum of the weight percentages of manganese, silicon, chromium, copper, molybdenum, vanadium and niobium is less than 0.3%.

13. (New) The alloy as claimed in Claim 9, wherein the oxygen content is less than or equal to 0.01%, the nitrogen content is less than or equal to 0.005%, and the phosphorus content is less than or equal to 0.005%.

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14. (New) The alloy as claimed in Claim 11, wherein the oxygen content is less than or equal to 0.01%, the nitrogen content is less than or equal to 0.005%, and the phosphorus content is less than or equal to 0.005%.

15. (New) The alloy as claimed in Claim 12, wherein the oxygen content is less than or equal to 0.01%, the nitrogen content is less than or equal to 0.005%, and the phosphorus content is less than or equal to 0.005%.

16. (New) A shadow mask, which comprises at least one foil having holes, said foil comprising an alloy, said alloy consisting essentially of iron and

$$32\% \leq \text{Ni} \leq 34\%$$

$$3.5\% \leq \text{Co} \leq 6.5\%$$

$$0\% \leq \text{Mn} \leq 0.1\%$$

$$0\% \leq \text{Si} \leq 0.1\%$$

$$0\% \leq \text{Cr} \leq 0.1\%$$

$$0.005\% \leq \text{C} \leq 0.02\%$$

$$\text{S} \leq 0.001\%$$

$$0.0001\% \leq \text{Ca} \leq 0.002\%$$

$$0.0001\% \leq \text{Mg} \leq 0.002\%$$

the chemical composition of the alloy furthermore satisfying the relationships:

$$\text{Co} + \text{Ni} \leq 38.5\%$$

$$\text{Co} + 0.5 \times \text{Ni} \geq 20\%$$

$$\text{Co} + 5 \times \text{Ni} \geq 165.5\%$$

wherein % is % by weight, and

$$\text{S} \leq 0.02 \times \text{Mn} + 0.08 \times \text{Ca} + 0.6 \times \text{Mg}$$

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wherein said alloy has a martensitic transformation start point of less than  $-186^{\circ}\text{C}$  and an average coefficient of thermal expansion between  $20^{\circ}$  and  $100^{\circ}\text{C}$  of from  $0.7 \times 10^{-6}/\text{K}$  to  $0.49 \times 10^{-6}/\text{K}$ .

17. (New) The shadow mask of Claim 16, wherein the average coefficient of thermal expansion is from  $0.65 \times 10^{-6}/\text{K}$  to  $0.49 \times 10^{-6}/\text{K}$ .

18. (New) A method of forming a shadow mask, comprising  
forming holes in a foil and  
drawing said hole-containing foil,  
wherein said foil comprises an alloy consisting essentially of iron and

$$32\% \leq \text{Ni} \leq 34\%$$

$$3.5\% \leq \text{Co} \leq 6.5\%$$

$$0\% \leq \text{Mn} \leq 0.1\%$$

$$0\% \leq \text{Si} \leq 0.1\%$$

$$0\% \leq \text{Cr} \leq 0.1\%$$

$$0.005\% \leq \text{C} \leq 0.02\%$$

$$\text{S} \leq 0.001\%$$

$$0.0001\% \leq \text{Ca} \leq 0.002\%$$

$$0.0001\% \leq \text{Mg} \leq 0.002\%$$

the chemical composition of the alloy furthermore satisfying the relationships:

$$\text{Co} + \text{Ni} \leq 38.5\%$$

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$$\text{Co} + 5 \times \text{Ni} \geq 165.5\%$$

wherein % is % by weight, and

$$\text{S} \leq 0.02 \times \text{Mn} + 0.08 \times \text{Ca} + 0.6 \times \text{Mg}$$